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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/025,716	12/18/2001	Ralf Bauermeister	A91222	8020

7590 04/25/2003
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EXAMINER

VIGUSHIN, JOHN B

ART UNIT PAPER NUMBER

2827

DATE MAILED: 04/25/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/025,716

Applicant(s)

BAUERMEISTER, RALF

Examiner

John B. Vigushin

Art Unit

2827

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 December 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8 and 10-15 is/are rejected.
- 7) ☐ Claim(s) 9 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 December 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☒ Other: See Continuation Sheet.

Continuation of Attachment(s) 6). Other: Documents N, U and V, as listed in attached Notice of References Cited (see PTO-892).

DETAILED ACTION

Claim Rejections - 35 USC § 112, 1st paragraph

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 10, 11 and 12 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The "undercuts" cited in the Specification p. 7, lines 20-21 and claimed in Claims 10, 11 and 12 are not sufficiently explained in the Specification and are not shown in the Drawings (see below). Consequently, one of ordinary skill in the art would not know how to make or use these "undercuts" to prevent erroneous mechanical connection of first and second mismatched boards. Therefore, the issues to be resolved are: *What are "undercuts," what do they look like, and how do they function "to prevent an erroneous joining" of unmatchable boards (see Specification, p.7, lines 19-21)?*

Claim Rejections - 35 USC § 112, 2nd paragraph

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claim 15 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 15 recites the limitation "the electrical isolation" in line 2. There is insufficient antecedent basis for this limitation in the claim. This rejection may be overcome by simply changing the claim dependency in line 1 from "1" to --5--.

Drawings

5. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "undercuts" of Claims 10, 11 and 12 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Rejections Based On Prior Art

6. The following references were relied upon for the rejections hereinbelow:

a) Dorinski et al. (US 5,110,298)

b) Schafer et al. (US 5,006,920)

c) Electronic Packaging and Interconnection Handbook, p.1.47, ed. Charles A.

Harper; © 1991.

d) The New Cassell's German Dictionary, p.305, Funk & Wagnalls, © 1971.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1-5, and 14 are rejected under 35 U.S.C. 102(b) as being anticipated by Dorinski et al.

As to Claim 1, Dorinski et al. discloses, in Fig. 4: a first board 110 having a first electric partial circuit 410, 412 and having a first edge formed as a first contact comb with successively arranged first projections 414 and first cutouts 104, 105; a second board 100 having a second electric partial circuit 344, 402 and having a second edge formed as a second contact comb with successively arranged second projections 102, 103 and second cutouts 406, wherein the second contact comb is configured to be complementary to the first contact comb (Figs. 4 and 5); first and second boards 110 and 100 are combined to form a complete circuit (Fig. 5; col.3: 28-48) with the first and second boards 110 and 100 substantially in a common plane (Fig. 5; col.3: 25-27); the first projections 414 captively engage second cutouts 406 and the second projections 102, 103 captively engage first cutouts 104, 105 (Figs. 4 and 5; col.2: 59-62; col.3: 6-10).

As to Claim 2, Dorinski et al. further discloses the first and second contact combs are parts of the printed circuit of the first and second boards 110 and 100, respectively (Figs. 4 and 5).

As to Claim 3, Dorinski et al. further discloses the first and second contact combs are monolithic parts of first and second boards 110, respectively (Figs. 4 and 5).

As to Claim 4, Dorinski et al. further discloses a thickness of the first and second contact combs matches a thickness of the first and second boards 110 and 100, respectively (Figs. 4 and 5; col.2: 45-47).

As to Claim 5, Dorinski et al. further discloses the first and second projections have respective longitudinal sides (Fig. 4), and each one of the longitudinal sides supports an electrically isolated lead (i.e., each one of the longitudinal sides of the first projections is coated with a conductive material, wherein the conductive material of the first projections is isolated by the lack of conductive material, i.e., a discontinuity, at first projection surface 414; and each one of the longitudinal sides of the second projections 102, 103 is coated with a conductive material, wherein the conductive material of the second projections is isolated by the lack of conductive material, i.e., a discontinuity, at portion 406 of the second aperture; the modification of Fig. 2 and col.3: 3-6 in the above-cited embodiment of Fig. 4 in col.3: 31-48).

As to Claim 14, Dorinski et al. further discloses the first and second contact combs extend over the entire length of the first and second edges, respectively (Fig. 1).

9. Claims 1-4, 13 and 14 are rejected under 35 U.S.C. 102(b) as being anticipated by Schafer et al.

As to Claim 1, Schafer et al. discloses, in Figs. 3 and 4, a printed circuit board arrangement for printed circuits with electronic components (col.4: 15-18), comprising: a first board 1 having a partial circuit and having a first edge formed as a first contact

comb with successively arranged first projections 10 and first cutouts 9; a second board 8 having a partial circuit and having a second edge formed as a second contact comb with successively arranged first projections 10 and first cutouts 9, wherein the second contact comb is configured to be complementary to the first contact comb (Figs. 3 and 4; col.4: 23-28); first and second boards 1 and 8 are combined to form a complete circuit and are substantially positioned in a common plane (col.4: 23-28 and 37-41); first projections 10 engage captively the second cutouts 9 and the second projections 10 engage captively the first cutouts 9 (col.4: 23-35).

As to Claim 2, Schafer et al. further discloses the first and second contact combs are parts of the printed circuit of the first and second boards 1 and 8, respectively (Figs. 3 and 4; col.4: 37-41).

As to Claim 3, Schafer et al. further discloses the first and second contact combs are monolithic parts of the first and second boards 1 and 8, respectively (Figs. 3 and 4; col.4: 23-28).

As to Claim 4, Schafer et al. further discloses a thickness of the first and second contact combs matches a thickness of the first and second boards 1 and 8, respectively (Fig. 3).

As to Claim 13, Schafer et al. further discloses the first and second projections 10 are substantially rectangular (Figs. 3 and 4) and have longitudinal sides (Figs. 3 and 4) providing joining edges extending in a joining direction of the first and second boards 1 and 8 (Fig. 4).

As to Claim 14, Schafer et al. further discloses the first and second contact combs extend over the entire length of the first and second edges, respectively (Fig. 4).

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dorinski et al. in view of the Electronic Packaging and Interconnection Handbook (hereinafter referenced as "The Handbook").

As to Claims 6 and 7:

I. Dorinski et al. discloses all the limitations of intervening Claim 5 and base Claim 1 including the conductive coating of Claim 5, but does not teach that the conductive coating material is copper.

II. However, the use of copper is notorious in the electronic circuit board art due to the old and well-known electro-mechanical characteristics of copper, as taught in The Handbook; specifically, The Handbook, on p.1.47, teaches that copper has a very high conductivity, generally excellent corrosion resistance and resistance to corrosion by most natural waters, making it widely useful for circuit board applications.

III. Therefore, it would have been obvious to one of ordinary skill in the art to use copper as the conductive coating material for the first and second edges of boards 110

and 100, respectively, and in particular, for the conductive coating material forming the contact leads on the longitudinal sides of the first and second projections 414 and 102/103 of Claim 5, in order to establish excellent and reliable electrical connections between first and second boards 110 and 100 due to the excellent packaging characteristics of copper, as taught by The Handbook.

12. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Schafer et al. in view of Heyer et al.

I. Schafer et al. discloses all the limitations of base Claim 1 and further teaches that first and second substrates 1 and 8 can be permanently bonded by means of an adhesive (col.4: 30-35) but does not further define the adhesive material.

II. Heyer et al. discloses, in Figs. 2 and 3: a first board 1 and a second board 5; said first board 1 having projections 3 with circuit traces 6 thereon; said second circuit board 5 having cutouts that border on circuit traces 6 of board 5. Heyer et al. further teaches permanently joining and electrically connecting first and second boards 1 and 5 by means of solder 7 (Fig. 3; English Abstract; p.4, lines 7-11: "Lötung" is German for "soldering"; see p.305 of The New Cassell's German Dictionary).

III. Since Schafer et al. and Heyer et al. are both in the art of joining circuit boards by engagement of the corresponding edge protrusions and cutouts, then the electrically conductive solder adhesive used as the adhesive which both mechanically and electrically connects the engaged circuit boards, as taught by Heyer et al., would have been readily recognized for the adhesive cited in the pertinent art of Schafer et al.

IV. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use solder as the adhesive cited in Schafer et al. in order to join the circuit boards at the corresponding edge projections and cutouts, as taught by Heyer et al., wherein the solder provides a very reliable permanent mechanical and electrical connection of the engaged circuit boards.

Allowable Subject Matter

13. Claim 9 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

14. Claim 15 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

15. As allowable subject matter has been indicated, applicant's reply must either comply with all formal requirements or specifically traverse each requirement not complied with. See 37 CFR 1.111(b) and MPEP § 707.07(a).

Conclusion

16. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Gualtieri et al. (US 6,304,082 B1) discloses all the limitations of Applicant's Claim 1 (Fig. 2b; col.3: 33-53) except that first and second boards 203 and 204 are not

“substantially positioned in a common plane,” as required in Applicant’s Claim 1; rather, they are mechanically and electrically connected in an orthogonal relationship (Fig. 1) by solder (Figs. 3c and 3d; col.4: 6-16).

McEuen (US 6,068,518) discloses connector housings 11a and 21 having interlocking fingers for establishing an electrical and mechanical coplanar connection of circuit boards 10a and 20 (Figs. 1A,B and 5A,B; col.4: 37-47

Khoury (US 6,440,775 B2: Figs. 3-6) and Khoury et al. (US 6,343,940 B1: Figs. 6A and 8) disclose interlocking projections and cutouts for mechanically (not electrically) joining circuit substrates.

Pelzl (US 5,019,947) discloses a coding element 3 on a subrack 1 of a PCB rack wherein slots 4 in the coding element 3 are selectively blocked by interlocks 9 and 10 in accordance with the predetermined connection configuration that determines how boards 6 are to be electrically and mechanically mounted to the subrack 1 (Fig. 1; col.2: 35-60).

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to John B. Vigushin whose telephone number is 703-308-1205. The examiner can normally be reached on 8:30AM-5:00PM Mo-Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner’s supervisor, David L. Talbott can be reached on 703-305-9883. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7382 for regular communications and 703-308-7382 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.



John B. Vigushin
Examiner
Art Unit 2827

jbv
April 22, 2003